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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/460,630	12/14/1999	BART DIERICKX	IMEC87.001CP	2743

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EXAMINER

LEE, EUGENE

ART UNIT PAPER NUMBER

2815

DATE MAILED: 06/10/2002

Please find below and/or attached an Office communication concerning this application or proceeding.

**Office Action Summary**

Application No.

09/460,630

Applicant(s)

DIERICKX, BART

Examiner

Eugene Lee

Art Unit

2815

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 06 March 2002.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-11 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-11 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on \_\_\_\_\_ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

**Priority under 35 U.S.C. §§ 119 and 120**

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☒ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

**Attachment(s)**

- 1) ☒ Notice of References Cited (PTO-892) 4) ☐ Interview Summary (PTO-413) Paper No(s). \_\_\_\_\_
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948) 5) ☐ Notice of Informal Patent Application (PTO-152)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) \_\_\_\_\_ 6) ☐ Other:

## DETAILED ACTION

### *Claim Rejections - 35 USC § 102*

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

2. Claims 1 and 4 thru 6 are rejected under 35 U.S.C. 102(b) as being anticipated by Miwada '719. Miwada discloses (see, for example, FIG. 2) a solid state imaging device (pixel structure) comprising a p-type silicon substrate 1, thick oxide film (insulating layer) 2, n-type rectangular region (collection region) NR1, transfer gate electrode (dual-purpose electrode) 8, and n-type impurity region (detection region) NR2. Area 3b comprises the n-type rectangular region (collection region) NR1 and vertical shift register 7 comprises the n-type impurity region (detection region) NR2. A photo radiation is fallen onto area 3b and when a low voltage level is applied to the transfer gate, charges will collect in area 3b. When a high voltage level is applied to the transfer gate, the charges will transfer to the vertical shift register. See, for example, column 2, lines 1-20.

### *Claim Rejections - 35 USC § 103*

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

4. Claims 2, 3, 7, and 8 are rejected under 35 U.S.C. 103(a) as being unpatentable over Miwada '719 as applied to claims 1 and 4 thru 6 above, and further in view of Kuroda et al. '013. Miwada does not disclose a barrier region of the first conductivity type with a concentration density of dopants being higher than the concentration density of dopants in the substrate. However, Kuroda discloses (see, for example, FIG. 5) a solid state image pickup element comprising a p+-type layer (barrier region) 13 surrounding an n-type region 5, 11. Kuroda teaches that providing such a layer will redirect a charge 14 to the photodiode 1. See, for example, column 2, lines 56-\*. Therefore it would have been obvious to one of ordinary skill in the art at the time of invention to include the p+-type layer underneath the n-type diffused layer of Miwada in order to direct charges to the pn junction and, consequently, reduce smearing, as taught by Kuroda.

5. Claims 9 thru 11 are rejected under 35 U.S.C. 103(a) as being unpatentable over Miwada '719 as applied to claims 1 and 4 thru 6 above, and further in view of Hook et al. '702 B1. Miwada does not disclose a pinning region. However, Hook discloses (see, for example FIG. 31) an active pixel sensor cell comprising a pinning region 70 partially covered and self-aligned with gates 68, 68'. See, for example, column 5, lines 3-18. It was well known in the art at the time of invention that pinning regions were used to improve the gathering of electrons within a semiconductor layer. See, for example, column 1, lines 15-23. Therefore it would have been obvious to one of ordinary skill in the art at the time of invention to include the pinning region of Hook in Miwada's invention in order to improve the collection and retention of electrons within the n-type diffused layer (collection region).

***Response to Arguments***

6. Applicant's arguments with respect to claims 1-11 have been considered but are moot in view of the new ground(s) of rejection.

**INFORMATION ON HOW TO CONTACT THE USPTO**

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Eugene Lee whose telephone number is 703-305-5695. The examiner can normally be reached on M-F 8-5.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Eddie C. Lee can be reached on 703-308-1690. The fax phone numbers for the organization where this application or proceeding is assigned are 703-308-7722 for regular communications and 703-308-7722 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703-308-0956.

Eugene Lee  
June 5, 2002



EDDIE LEE  
SUPERVISORY PATENT EXAMINER  
TECHNOLOGY CENTER 2800